PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
P16406PC00/CA		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/SE02/01816	10.04.2002	04.10.2001
International Patent Classification (IPC) or national classification and IPC7		
A23J 1/14, A23J 3/14, A23L 1/29		
Applicant		
BIOVELOP INTERNATIONAL B.V. ET AL		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 3 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
02.05.2003	21.11.2003
Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. 08-667 72 88	Telex 17978 PATOREG-S
Authorized officer Dagmar Järvman/EÖ Telephone No. 08-782 25 00	

Form PCT/IPEA/409 (cover sheet) (January 1998)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE02/01816

I. Basis of the report

1. With regard to the **elements** of the international application:*

☐ the international application as originally filed

☒ the description:
pages 1-9 , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____

☒ the claims:
pages _____ , as originally filed
pages _____ , as amended (together with any statement) under article 19
pages _____ , filed with the demand
pages 1-4 , filed with the letter of 2003-11-07

☒ the drawings:
pages 1 , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____

☐ the sequence listing part of the description:
pages _____ , as originally filed
pages _____ , filed with the demand
pages _____ , filed with the letter of _____

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language _____ which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages _____

☐ the claims, Nos. _____

☐ the drawings, sheet/fig _____

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2 (c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item I and annexed to this report.*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/SE02/01816

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-27	YES
	Claims		NO
Inventive step (IS)	Claims	1-27	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-27	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Amended claims has been filed on 2003-11-07. Originally claims 21 and 28-31 have been deleted.

Cited documents in the International Search Report:

D1 WO 9856260 A1

D2 DATABASE WPI,Week 199225,Derwnet Publication Ltd., London, GB;Class D13, AN 1992-206820 & SU 1664245 A1,(UNIV CHERNOVTSY),23 july 1991 (1991-07-23), abstract

D3 US 3402165 A

D4 GB 2127425 A

D5 DE 19907723 A1.

The cited documents represent the general state of the art.

The cited prior art does not give any indication that would lead a person skilled in the art to the claimed process for wet fractionation of oil seed press cake and/or meal. Therefore, the claimed invention is not obvious to a person skilled in the art.

Accordingly, the invention in claims 1-27 is novel and is considered to involve inventive step. The invention is industrially applicable.

CLAIMS

1. Process for the wet fractionation of oil seed press cake and/or meal, **characterized** in that oil seed press cake or meal is dispersed in water and subjected to a combined treatment of wet milling, enzymes and heat, followed by a sequential fractionation at an elevated temperature using centrifugal forces and size exclusion (ultrafiltration) so as to yield one or more fibrous-rich fractions, at least three different protein-rich fractions, optionally an oil-rich fraction, a sugar-rich fraction and a phytate-rich fraction, followed by a final step consisting of drying or partial evaporation of the above-said fractions.

2. Process according to claim 1, wherein oil seed press cake or meal is the residual fibrous-protein fraction obtained from conventional oil extraction processes of oil seeds of the type Soya, rapeseed, cottonseed, sunflower, linseed and flax seed.

3. Process according to claims 1-2, wherein the combination of wet milling, enzymatic and heat treatment is carried out to achieve a high efficiency in the subsequent fractionation of the main components of oilseed press-cake and meal, i.e. fibre, protein, oil, sugars and phytate, and that an extraction rate of both protein, residual fat and phytate of at least 70% from the original material is achieved.

4. Process according to claims 1-3, wherein the enzymatic treatment is accomplished by using one or a combination of more than one of the following enzymes: beta-glucanase, xylanase, hemicellulase, arabinase and pectinase.

5. Process according to claim 1, wherein an enzyme inactivation step is carried out prior to the fractionation step or drying step.

6. Protein fraction obtained in accordance with the process of claims 1-5, wherein the said fraction is provided in a dry form with at least 88% dry matter, and it is comprised of one or more protein fractions produced in the said process, and it contains 30 to 95% protein, and 1 to 60% oil.

7. Protein fraction obtained in accordance with the process of claims 1-4, wherein the said fraction is provided in a dry form with at least 88% dry matter, and it is comprised of one or more protein fractions produced in the said process, and it contains 30 to 95% protein, 1 to 60% oil, and it contains active enzymes of the type used in the process.

8. Oil fraction obtained in accordance with the process of claims 1-5, wherein the said fraction is provided as an emulsified oil, and it is comprised of one or two oil fractions produced in the said process, and it contains at least 60% fat, and less than 30% protein.

9. Oil fraction obtained in accordance with the process of claims 1-4, wherein the said fraction is provided as an emulsified oil, and it is comprised of one or two oil fractions produced in the said process, and it contains at least 60% fat, and less than 30% protein, and it contains active enzymes of the type used in the process.

10. Fibre fraction obtained in accordance with the process of claims 1-5, wherein the said fraction in provided in a dry form with at least 88% dry matter, and it is comprised of at least 50% fibre, 15% protein and 10% fat.

11. Fibre fraction obtained in accordance with the process of claims 1-4, wherein the said fraction in provided in a dry form with at least 88% dry matter, and it is comprised of at least 50% fibre, 15% protein and 10% fat, and it contains active enzymes of the type used in the process.

12. Sugar fraction obtained in accordance with the process of claims 1-5, wherein the said fraction in provided in a syrup form with at least 75% dry matter, and it consists of at least 50% neutral and acidic sugars.

13. Sugar fraction obtained in accordance with the process of claims 1-4, wherein the said fraction in provided in a syrup form with at least 75% dry matter, and it consists of at least 50% neutral and acidic sugars, and it contains active enzymes of the type used in the process.

14. Phytate fraction obtained in accordance with the process of claims 1-5, wherein the said fraction in provided in a dry form and contains 30 to 80% phytate.

15. Use of a protein fraction, as described in claim 6, in food or feed applications as a protein ingredient or functional protein to replace other protein products from vegetable, animal and microbial sources.

16. Use of a protein fraction, as described in claim 7, in feed applications as a protein ingredient to replace other protein products from vegetable, animal and microbial sources, with active enzymes used in the process for enhanced nutritive value.

17. Use of an oil fraction, as described in claim 8, in food or feed applications as a fat substitute or emulsifier to replace other fat products from vegetable and animal sources.

18. Use of an oil fraction, as described in claim 9, in feed applications as a fat substitute or emulsifier to replace other fat products from vegetable and animal sources, with active enzymes used in the process for enhanced nutritive value.

19. Use of a fibre fraction, as described in claim 10, in feed applications as a balanced feed ingredient.

20. Use of a fibre fraction, as described in claim 11, in feed applications as a balanced feed ingredient, with active enzymes used in the process for enhanced nutritive value.

21. Use of a syrup fraction, as described in claim 12, in feed applications as an energy source or a compound feed binder, or as a media for microbial fermentation.

22. Use of a syrup fraction, as described in claim 13, in feed applications as an energy source or compound feed binder, with active enzymes used in the process for enhanced nutritive value.

23. Use of a phytate fraction, as described in claim 14, in food and feed applications as an anti-oxidant and taste enrichment agent and in nutraceutical / cosmoceutical / pharmaceutical applications as a cancer-preventing, urinary calculi-preventing and bacterial tooth plaque-preventing agent.

24. Use of a phytate fraction, as described in claim 14, in nutraceutical / cosmoceutical / pharmaceutical applications as a cancer-preventing.

25. Use of a phytate fraction, as described in claim 14, in nutraceutical / cosmoceutical / pharmaceutical applications as a urinary calculi-preventing agent.

26. Use of a phytate fraction, as described in claim 14, in nutraceutical / cosmoceutical / pharmaceutical applications as a bacterial tooth plaque-preventing agent.

27. Set up for carrying out the process according to claims 1-5,
characterized in
that it comprises a hydrolysis and heat treatment vessel (1), a wet mill (2), a heat exchanger (3) for enzymatic inactivation, mixing tanks (7, 9 and 12), decanters (4 and 8), separators (11 and 13), an ultra-filter (9), an evaporator (10), and dryers (5, 6 and 14).